4. SAMPLING DESIGN SUMMARY

The material presented in this section is intended to support the DQOs summarized in Section 3. Field screening measurements in conjunction with confirmation samples will be collected to support the DQOs presented in Section 3.

4.1 Quality Assurance/Quality Control Samples

The QA samples will be included to satisfy the QA requirements for the field operations as per the QAPjP. The duplicate, blank, and calibration (QA/QC) samples will be analyzed as outlined in Section 3.

4.2 Sampling Locations and Frequency

For the sites being remediated (ARA-01, ARA-12, and ARA-23), sampling is required to confirm that the remediation goals and hence the remedial action objectives have been achieved. The following sections discuss the locations and frequency with which samples will be collected from the individual sites covered under this FSP.

4.2.1 ARA-01

Sampling activities at ARA-01 will include the collection of field screening samples and confirmation samples that will be sent to an approved analytical laboratory. A minimum of 30 samples will be collected for field screening purposes from the surface of the exposed soils after the first 7.6 cm (3 in.) of contaminated soils have been removed. The sample locations will be selected from a systematic grid within the geographic boundary of the ARA-01 site as shown in Figure 4-1. The field screening samples will be analyzed on-Site using a laboratory-grade XRF spectrometer. Based on the results of the field screening, there are two options for proceeding with the remedial action and field sampling:

- If the field screening analyses show that the samples are below the remedial action goals for all of the COCs (arsenic, selenium, and thallium), then a minimum of 10 confirmation samples (see Figure 4-1) will be collected and shipped to an approved analytical laboratory for confirmation analyses.

- If the field screening analyses show that any samples are above the remedial action goals for any of the COCs, additional hot-spot excavation will be conducted in the area where the sample(s) were collected and additional field screening analyses will be performed. This process will be repeated until the field screening results show that the remedial action objectives have been met or until all soil is removed to basalt.

If the mean concentrations from either the initial sampling or the statistical sampling show that the remediation goals have been exceeded, additional excavation and field screening measurements will be required. If this is ever the case, confirmation sampling will be performed only in the newly excavated area at the same latitude and longitude as the initial confirmation sample location(s), and the data set will be reevaluated to determine whether or not the remedial action objectives have been met. This will eliminate resampling of the entire ARA-01 site.

4.2.2 ARA-12

Similar to ARA-01, sampling activities at ARA-12 will include the collection of field screening samples and verification samples; additionally, measurements with the ORTEC ISO-CART, or other comparable system, will be made at the same locations to evaluate the levels of Ag-108m. Field screening samples for copper, mercury and selenium analyses, and in situ measurements for Ag-108m will be made

Figure 4-1. ARA-01 field measurement locations after first excavation.

after the initial layer of contaminated soils has been removed as shown in Figure 4-2. The field screening samples for copper, mercury and selenium will be analyzed on-Site using a laboratory-grade XRF spectrometer (copper and selenium) and atomic absorption spectrometer (mercury). As with the ARA-01 site, continuation of the remedial action process will be based on the field sampling results. If field screening results show that the remedial action objectives have been met for all of the COCs, then verification sampling/measurements will be conducted as detailed below.

For copper, mercury, and selenium, verification sampling will be performed following the same approach as specified for ARA-01. The number of samples collected for copper, mercury, and selenium analyses will be based upon the largest variance as determined from the field screening methods. Analysis of the data will determine whether the remediation goals have been achieved for these metals as stated previously in Section 3.2.

The verification sampling for Ag-108m will be comprised of a combination of 30 field measurements and a minimum of 10 laboratory samples. Field measurements will be performed using either the ORTEC ISO-CART or other comparable system (refer to Section 6.1.2). The laboratory samples will be selected at random from within the geographic boundaries of the ARA-12 site, and are shown in Figure 4-2.

The ORTEC ISO-CART detector will be set upon a stand that maintains a constant detector-to-ground distance of one meter. At this elevation, the germanium spectrometer has a field of view approximately 20 m (66 ft) in diameter. A sodium iodide detector mounted on a medical crutch or similar configuration may also be used to locate "hot-spots:" with actual confirmatory measurements performed with the ISO-CART or other comparable system.

It will be necessary to correlate the Ag-108m screening data to actual laboratory analysis; however, it is important to realize the shortcomings of attempting such a correlation due to sample collection methods. For the field screening methods, a much larger area is analyzed at one time; whereas, with laboratory analytical methods, much greater reliance is placed on the field sampling techniques to ensure that representative samples are obtained. Verification samples will be comprised of 10 subsamples taken from radial distances of 2, 4, and 10 m (6.5, 13, and 33 ft) from the grid center as detailed in Section 6.1.2. An estimation of the spatial heterogeneity can be obtained from the analysis of both analytical and field duplicate samples. Correlation of field screening data with laboratory data will take this variability into account when making the statistical comparison of the two data sets.

4.2.3 ARA-23

Sampling activities at ARA-23 will include field measurements and the collection of verification samples. Verification sampling for Cs-137 at ARA-23 will be comprised of a combination of field screening and laboratory analysis. The field measurements will be performed using the GPRS and the ORTEC ISO-CART, or other comparable system. The ARA-23 area will be divided into 5 separate areas for consideration under the statistical sampling: 1) ARA-I facility, 2) ARA-II facility, 3) haul road and turn around area, 4) equipment washdown area, and 5) windblown area. The area within the boundaries of the SL-1 burial ground will be included with the haul road and turn around areas. The GPRS will be used to identify hot spots and provide semi-quantitative numbers for the Cs-137 concentrations. The ISO-CART will then be used to measure a minimum of 30 locations within each area as shown in Figure 4-3. The field measurement locations will be selected from a systematic grid from within the geographic boundaries of the five areas within ARA-23. The GPRS and ISO-CART systems will provide 100% coverage of the ARA-23 site to ensure that hot spots exceeding 23 pCi/g do not remain.

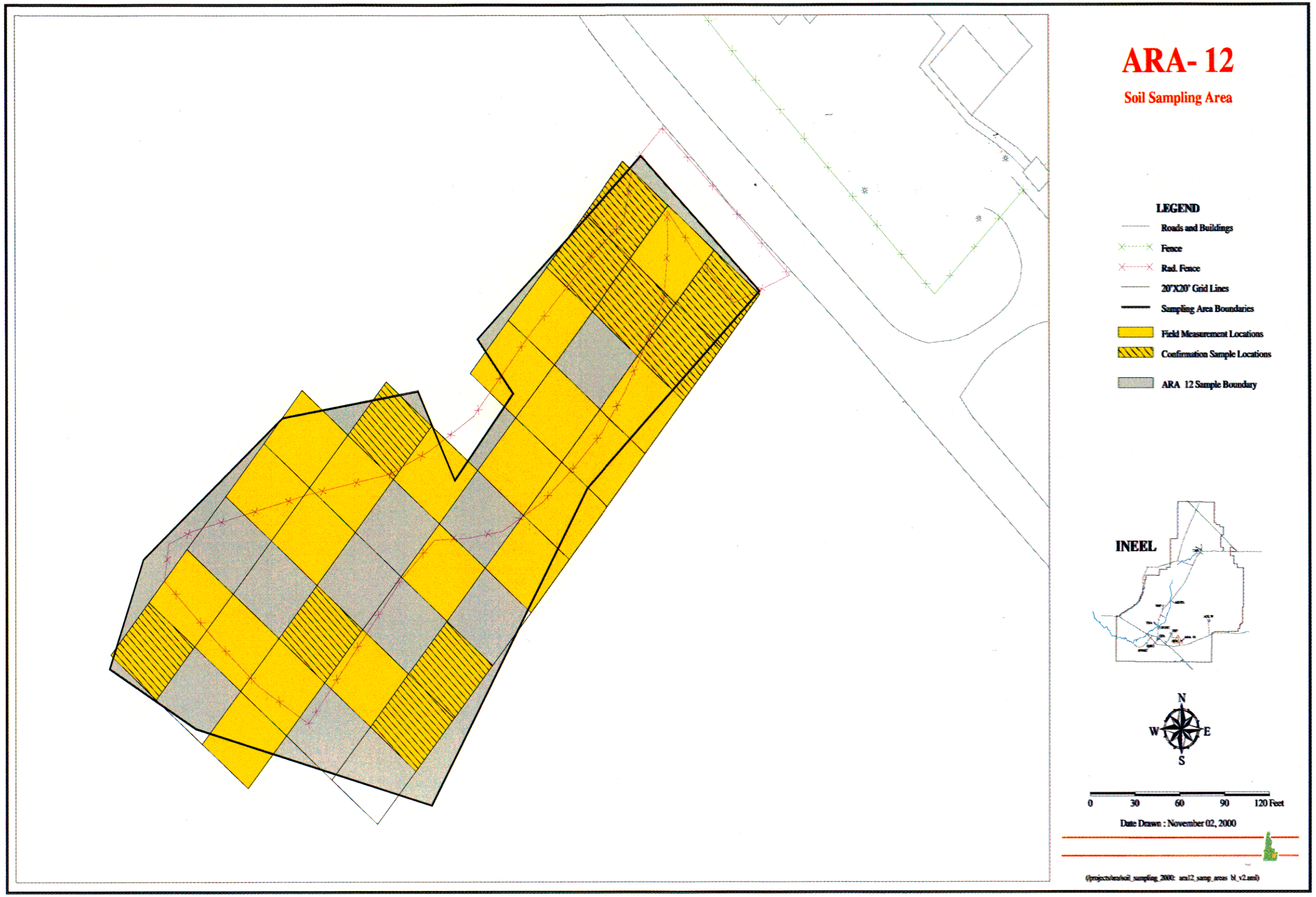

Figure 4-2. ARA-12 field measurement locations after first excavation.

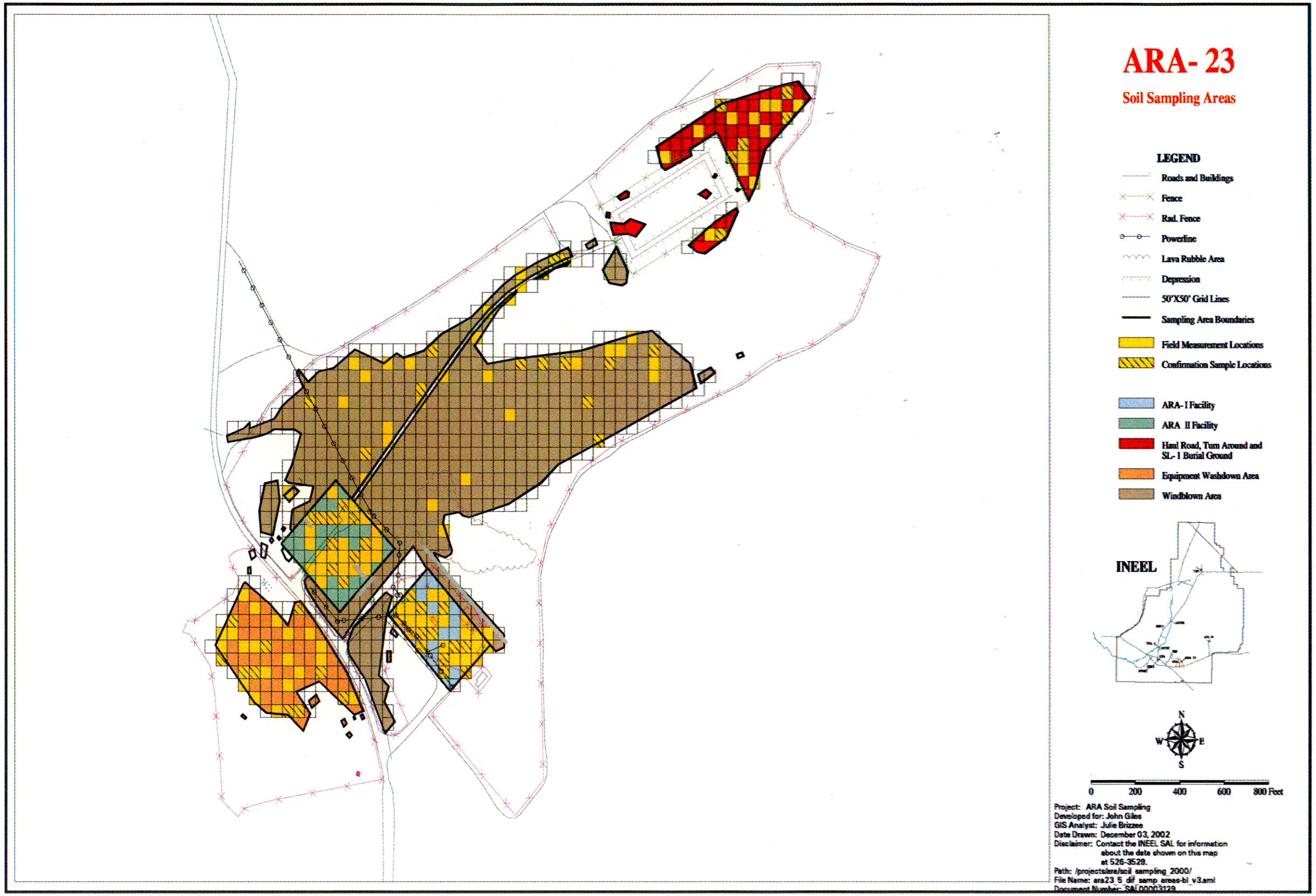

Figure 4-3. ARA-23 field measurement locations after first excavation.

The confirmation sampling for Cs-137 will be comprised of a combination of field measurements and 10 laboratory samples from each of the five identified areas within the ARA-23 site. Field measurements will be performed using either the ORTEC ISO-CART or other comparable system (refer to Section 6.1.2). The laboratory samples will be selected at random from within the geographic boundaries of the ARA-23 site.

As for the Ag-108m at ARA-12, a correlation of Cs-137 field screening data to laboratory data will be performed, again taking into account variability due to field sampling techniques when making the comparison of the two data sets.

5. SAMPLING DESIGNATION

5.1 Sample Identification Code

A systematic character identification (ID) code will be used to uniquely identify all laboratory samples. Uniqueness is required for maintaining consistency and preventing the same ID code from being assigned to more than one sample.

The first designator of the code, *5,* refers to the sample originating from WAG *5.* The second and third designators, RA, refer to the sample being collected in support of the remedial action. The next three numbers designate the sequential sample number for the project. A two-character set (i.e., 01, 02) will be used to designate field duplicate samples. The last two characters refer to a particular analysis and bottle type. Refer to the SAP tables in Appendix A for specific bottle code designations.

For example, a soil sample collected in support of confirming the Cs-137 concentrations via gamma spectrometric analysis might be designated as 5RA00101R4 where (from left to right):

- **5** designates the sample as originating from WAG 5
- **RA** designates the sample as being collected in support of the remedial action
- **001** designates the sequential sample number
- **01** designates the type of sample (01 = original, 02 = field duplicate)
- **R4** designates gamma spectrometric analysis.

SAP table/database will be used to record all pertinent information associated with each sample ID code.

5.2 Sampling and Analysis Plan Table/Database

5.2.1 Sampling and Analysis Plan Table

A sampling and analysis plan (SAP) table format was developed to simplify the presentation of the sampling scheme for project personnel. The following sections describe the information recorded in the SAP table/database, which is presented in Appendix A.

5.2.2 Sample Description

The sample description fields contain information relating individual sample characteristics.

5.2.2.1 Sampling Activity. The sampling activity field contains the first six characters of the assigned sample number. The sample number in its entirety will be used to link information from other sources (field data, analytical data, etc.) to the information in the SAP table for data reporting, sample tracking, and completeness reporting. The analytical laboratory will also use the sample number to track and report analytical results.

5.2.2.2 Sample Type. Data in this field will be selected from the following:

- REG for a regular sample
- QC for a QC sample.

5.2.2.3 Media. Data in this field will be selected from the following:

- SOIL for soil samples
- WATER for QAIQC water samples.

5.2.2.4 Collection Type. Data in this field will be selected from the following:

- GRAB for grab sample collection
- COMP for composite sample collection
- RNST for rinsate QA/QC samples
- DUP for field duplicate samples
- FBLK for field blank QA/QC samples.

5.2.2.5 Planned Date. This date is related to the planned sample collection start date.

5.2.3 Sample Location Fields

This group of fields pinpoints the exact location for the sample in three-dimensional space, starting with the general AREA, narrowing the focus to an exact location geographically, and then specifying the DEPTH in the depth field.

5.2.3.1 Area. The AREA field identifies the general sample collection area. This field should contain the standard identifier for the INEEL area being sampled. For this investigation, samples are being collected from ARA-01, ARA-12, and ARA-23; the AREA field identifier will correspond to one of the three sites.

5.2.3.2 Location. The LOCATION field may contain geographical coordinates, x-y coordinates, building numbers, or other location identifying details, as well as program specific information such as borehole or well number. Data in this field will normally be subordinated to the AREA. This information is included on the labels generated by the SAM to aid sampling personnel.

5.2.3.3 Type of Location. The TYPE OF LOCATION field supplies descriptive information concerning the exact sample location. Information in this field may overlap that in the location field, but it is intended to add detail to the location.

5.2.3.4 Depth. The DEPTH of a sample location is the distance in feet from surface level or a range in feet from the surface.

5.2.4 Analysis Types (AT1-AT2O)

These fields indicate analysis types (radiological, chemical, hydrological, etc.). Space is provided at the bottom of the form to clearly identify each type. A standard abbreviation should also be provided if possible.

6. SAMPLING PROCEDURES AND EQUIPMENT

The following sections describe the sampling procedures and equipment to be used for the planned sampling and analyses described in this FSP. Prior to the commencement of any sampling activities, a prejob briefing will be held to review the requirements of the FSP and the project HASP and to ensure all supporting documentation has been completed.

6.1 Sampling Requirements

Sampling requirements for Phase II of the WAG *5* remedial action sampling are outlined in the following sections. Table 6-1 provides the requirements for sample containers, preservation methods, sample volumes, and holding times for soil and QA/QC samples. The specific analyses required are provided in Section 3.

Table 6-1. Specific sample requirements for the Waste Area Group 5 Phase II remedial action.

Analytical Parameter	Container		Sample Matrix	Preservative	Analytical Method	Holding Time
	Size	Type				
Radionuclides	16-oz	WM HDPE	Soil	None	Gamma Spectroscopy	6 months
Radionuclides	2-L	HDPE	Water	HNO_3 to pH<2	Gamma Spectroscopy	6 months
Metals	250-mL	WM Glass	Soil	Cool to 4°C	SW-846 6010B/7000A/ 7471A	28 days for Hg, 6 months for all others
Metals	1-L	HDPE	Water	HNO_3 to pH<2	SW-846 6010B/7000A1 7470A/7471A	28 days for Hg, 6 months for all others

6.1.1 Field Measurements

Field measurements and field screening samples will be collected in support of the remedial activities at the ARA-01, ARA-12 and ARA-23 sites. Additionally, field measurements for radiological COCs will be made and used to support the decision that the remedial action objectives have been met for the ARA-12 and ARA-23 sites. The following sections describe the field measurement and field screening equipment and the associated project requirements associated with the measurement systems.

6.1.1.1 GPRS Operations. The INEEL GPRS is a mobile field survey system designed to rapidly characterize the areal extent of gamma-emitting radionuclide contamination of surficial soils. The GPRS consists of two large-area plastic scintillation radiation detectors mounted to the front of an all-terrain vehicle that is equipped with global positioning system navigation instruments. The GPRS integrates the radiological data with the global positioning system data to provide information regarding the spatial distribution of contamination in the form of an area map.

The GPRS will be the primary means of determining whether sufficient layers of soil have been removed from the ARA-12 and ARA-23 sites to meet the remediation goals. Operation of the GPRS will follow the procedures outlined in TPR-6525, "Surface Radiation Surveys Using the GPRS." The unit will be deployed at the contaminated soil sites to obtain surface radiation measurements. Data will be reduced

and area maps constructed delineating the hot spots and gamma contamination contours of the individual sites. Decontamination of the GPRS will be conducted as per the HASP (INEEL 2003).

6.1.1.2 Gamma Field Screening. Two additional types of portable field instrumentation may be used in measuring gamma emitters. The first type of gamma field screening instrumentation that will be used is a HPGe gamma spectroscopy detector such as the ORTEC ISO-CART or other comparable system. The instrument will be positioned 1 m (3.3 ft) above ground for the initial scanning activity. The resulting field of view at this elevation is a circle with a diameter of 20 m (66 ft). The instrument will be located as described in Section 4 with overlapping zones of influence to ensure the scanning of the entire surface of interest. If gamma radiation is detected, the detector may be lowered in-place, or collimators may be used to narrow the field of view to aid in the identification and delineation of hot spots. Operation of the instrument will follow the procedures outlined in the user's manual for the ISO-CART System (ORTEC 1999) or other appropriate system operating manual.

One of the distinct advantages of in situ measurements relates to the sensor field of view. The field of view may be made quite large through appropriate sensor design, permitting the detector to count photons emitted over an extended area. Thus, even for low radionuclide concentrations, a large number of photo-detector interactions occur and the measurement may be made rapidly. Thus, it becomes possible to fully map radionuclide concentrations over a large area. By utilizing overlapping fields of view, it is ensured that areas with concentrations exceeding the remedial action goal are not missed. A second advantage is the ability to estimate contaminant depth distribution. Ag-108m emits three gamma rays at significantly different energies, 433.94 keV, 614.28 keV, and 722.91 keV, and known intensities (approximately 90% for each gamma ray). An estimation of the depth distribution may be made by calculating the degree of attenuation, taking into consideration detector efficiency, of two of the different gamma rays; i.e., 433.94 keV and 722.91 keV. Given a source of Ag-108m that is distributed on the surficial soils, the ratio of the peak intensities from the two widely spaced gamma rays is known. However, if the source is either buried, or distributed, the peak ratio will be measurably different. The difference can be used to calculate an estimated depth of the source. Similar to Ag-108m, the in situ measurement techniques for Cs-137 include methods for addressing the depth distribution of the radionuclide. A K x-ray emitted in the Cs-137 decay chain permits a comparison of attenuation between photons having very different energies. The K x-ray and the 662 keV gamma ray are emitted in known ratios, with the higher energy 662 keV gamma ray having much greater penetrating ability. Therefore, for a deep soil source, virtually none of the lower energy (32 keV) K x-rays would escape the shielding effect of the soil while the gamma rays would still be detected. Conversely, K x-rays and gamma rays are detected in very nearly the proportion they are emitted for a surface source. Therefore, this information can be used to determine during excavation whether additional excavation may be needed to remove a Cs-137 source located beneath the surface (Oertel 2003).

The secondary scanning equipment will be a portable gamma scintillometer using a sodium iodide (NaI) crystal. The gamma survey will be conducted by sweeping the NaI detector approximately 0.6 to 0.9 m (2 or 3 ft) to either side of the direction of travel while maintaining the detector a few inches above ground level. The travel speed of the operator will be limited to no more than 0.22 m/sec (0.73 ft/sec). Operation of the NaI instrument will follow the procedures outlined in *SAM 935 Surveillance and Measurement System Instructions* (Berkley Nucleonics 1999). These instruments will be used primarily in those areas inaccessible by the GPRS. In addition, the instruments may be used as a secondary check of the GPRS results.

6.1.1.3 Toxic Metals Field Screening. Field screening samples will be collected at the ARA-01 and ARA-12 sites and analyzed for toxic metals on the COC list for each site identified in Table 2-1. The field screening samples will be transported to the laboratory where aliquots will be prepared for batch analysis. The XRF analyzer is capable of analyzing individual samples for several different metals,

including arsenic, copper, selenium, and thallium, in a single measurement. The atomic absorption spectrometer will be used for mercury analysis. The reported method detection limits of the laboratory XRF and atomic absorption spectrometer for the COCs are listed in Table 6-1.

As can be seen from Table 6-2, the method detection for limits of the field screening instruments are well below the remedial action goals for the Phase II remediation activities with the exception of mercury. Past sampling activities at the ARA-12 site show that mercury is co-located with the other COCs; therefore, field screening samples will be analyzed for copper and selenium to evaluate whether or not the remedial action objectives have been achieved. When the field screening samples show that the remedial action objectives have been met for copper and selenium, confirmation samples will be collected and analyzed for the full suite of COCs listed in Table 2-1.

Table 6-2. Laboratory method detection limits for OU 5-12 nonradiological contaminants of concern.

Site	COC	Method Detection Limit (mg/kg)	Remedial Action Goal (mg/kg)
ARA-01	Arsenic	0.6	10
	Selenium	0.6	2.2
	Thallium	1.7	4.3
ARA-12	Copper	0.9	220
	Mercury	0.04	0.5
	Selenium	0.6	2.2

6.1.2 Surface Soil Sampling

Confirmation samples will be collected from surface soils following excavation. For the radionuclide-contaminated sites, these samples will serve to validate the results obtained by the GPRS and the gamma field screening instrumentation. For the hazardous contaminated sites, the confirmation samples will be used to confirm that the site remediation goals have been achieved.

The surface soil samples will be collected following the procedures outlined in TPR-6675, "Collecting Samples Using Scoops, Spoons, and Shovels." All surface samples to be analyzed for metals will be spatial composites of five subsamples collected from the four corners and the center of the 1 by 1-in (3.3 by 3.3 ft) plots. All surface samples to be analyzed for radionuclides will be spatial composites of ten subsamples collected at the center, and radial distances of 2, 4, and 10 m from the center, of the grid as shown in Figure 6-1. This configuration will provide a more representative sample to compare with the ISO-CART measurements. The samples will be collected between 0 to 7.6 cm (0 to 3 in.) in depth using a decontaminated trowel, spoon, or shovel. If soil conditions are not conducive to sampling by this method, either a thief sampler or hand auger may be used. Notation will be made in the sampling logbook at to which sampling method was employed.

In an attempt to make the in-situ measurement results more comparable to the radiological analytical sample data, the confirmation samples for radionuclides will be composite samples comprised of 10 equal volume subsamples taken at radial distances of 2, 4, and 10 m (6.5, 13, and 33 ft.) from the center of the sampling grid. These distances represent the effective field of view of the in-situ spectrometer as shown in Figure 6-1 below.

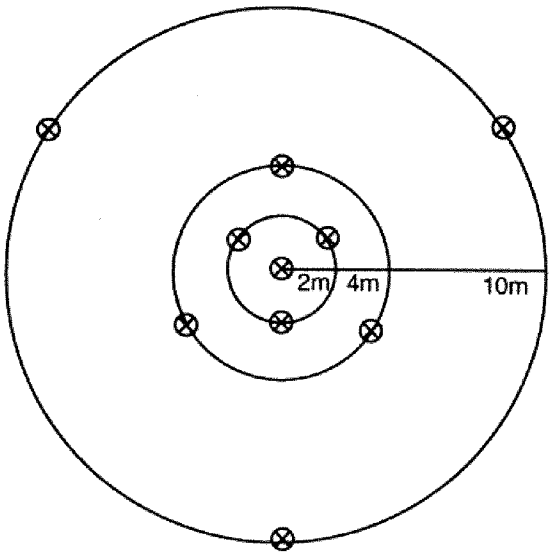

Figure 6-1. Composite sample plan for radiological samples.

Each subsample will be sieved, using a stainless steel spoon, through a 2-mm (0.08 in.) mesh stainless steel screen into a disposable aluminum pan. This procedure will be conducted at each of the subsample points to remove all large rocks and debris. Following the collection of all subsamples, the soil in the aluminum pan will be thoroughly mixed with the stainless steel spoon. Sample containers will be filled from this composite. Sample material left over will be returned to the sample grid from which it originated. Each sample container will be surveyed by radiological control (RadCon) personnel and labeled appropriately if radiation readings exceed 100 counts above background.

Decontamination of sampling equipment will be performed as per TPR-6676, "Decontaminating Sampling Equipment." Dry decontamination methods will be used to the extent practicable to minimize the generation of liquid decontamination waste.

6.1.3 Shipping Screening

Following sample collection, all samples will be surveyed for external contamination and field screened for radiation levels. All samples destined for off-Site laboratory analysis may be submitted to the Radiation Measurements Laboratory located at the Test Reactor Area at the INEEL for a 20-minute gamma screen prior to shipment. The field team leader (FTL) or RadCon technician may request shipping screens of specific samples from those sites where the radionuclide contamination is fairly well characterized or nonexistent. Gamma screening can be done using the same sample as that obtained for the gamma spectroscopic analysis, if such a sample is collected and is in the proper container.

6.2 Handling and Disposition of Remediation Waste

Remediation waste will be generated during the sampling activities as described herein. Wastes generated at all sites (ARA-01, ARA-12, and ARA-23) will be considered low level radioactive nonhazardous and not characteristic for Resource Conservation Recovery Act (RCRA) constituents. Samples will be handled in accordance with MCP-3480, "Environmental Instructions for Facilities, Processes, Materials, and Equipment." All waste streams generated from the sampling activity will be characterized in accordance with MCP-62, "Waste Generator Services–Low-Level Waste Management," and will be handled, stored, and disposed of accordingly.

Waste will be generated as a result of the sampling activities conducted during this project. Wastes expected to be generated during the sampling include the following:

- Personal protective equipment
- Unused/unaltered sample material
- Analytical residues
- Sample containers
- Miscellaneous wastes
- Contaminated equipment.

Depending upon the sampling site, wastes may be considered low level. As sampling continues, additional waste streams may be identified. All new waste streams projected, as well as those identified above, are required to have the waste identified and characterized. A hazardous waste determination will be completed for all waste generated during the OU 5-12 Phase II remedial action.

The wastes associated with the sampling activities will be managed in a manner that complies with the established ARARs, protects human health and the environment, and achieves minimization of remediation waste to the extent possible. The ARARs applicable to the storage of wastes are defined in accordance with the *Final Record of Decision Power Burst Facility and Auxiliary Reactor Area, Operable Unit 5-12* (DOE-ID 2000a). The basic provisions of the ARARs provide for appropriate waste containerization and compliant storage of the remediation wastes for an interim storage period. Protection of human health and the environment is achieved through implementation of the ARARs and through implementation of the waste management approach described herein.

6.2.1 Waste Minimization

Waste minimization techniques will be incorporated into planning and daily work practices to improve worker safety and efficiency. In addition, such techniques will aid in reducing the project environmental and financial liability. Specific waste minimization practices to be implemented during the project will include but not be limited to the following:

- Excluding materials that could become hazardous wastes in the decontamination process (if any)
- Controlling transfer between clean and contaminated zones
- Sequencing of excavation to minimize tracking of contamination into clean areas
- Designing containment such that contamination spread is minimized
- Collecting all samples necessary at one time, such that additional wastes are not generated due to resampling.

The *U.S. Department of Energy Idaho Operations Office Idaho National Engineering and Environmental Laboratory Interim Pollution Prevention Plan* (DOE-ID 2000b) addresses the efforts to be expended and the reports required to track waste generated by projects. This plan directs that the volume of waste generated by INEEL operations will be reduced as much as possible.

Industrial wastes do not require segregation by type; therefore, containers will be identified as industrial waste and maintained outside the controlled area for separate collection. Contaminated waste has the potential to be low level. This waste will require segregation as either incinerable (e.g., wipes, personal protective equipment [PPE]) or nonincinerable (e.g., concrete), in anticipation of subsequent waste management. Containers for collection of contaminated waste will be clearly labeled to identify waste type and will be maintained inside the controlled area as defined in the project HASP until removal for subsequent management.

6.2.2 Laboratory Samples

All laboratory and sample waste is managed in accordance with the SAM master task agreements, as part of the contract for the subcontracted laboratory. The laboratory will dispose of any unused sample material. The laboratories are responsible for any waste generated as a result of analyzing the samples. In the event that unused sample material must be returned from the laboratory, only the unused, unaltered samples in the original sample containers will be accepted from the laboratory. These samples will be returned to the waste stream from which they originated. If the laboratory must return altered sample material (e.g., analytical residue), the laboratory will specifically define the types of chemical additives used in the analytical process and assist in making a hazardous waste determination. This information will be provided to the project FTL and environmental compliance coordinator. Management of this waste will also require separation from the other unaltered samples being returned.

6.2.3 Packaging and Labeling

Containers used to store and transport hazardous waste must meet the requirements of 40 CFR 264, Subpart I. The *Idaho National Engineering and Environmental Laboratory Reusable Property, Recyclable Materials, and Waste Acceptance Criteria* (DOE-ID 2002c), hereinafter referred to as the reusable property, recyclable materials, and waste acceptance criteria (RRWAC), contains additional details concerning packaging and container conditions. Appropriate containers for RCRA waste include 208-L (55-gal) drums and other suitable containers that meet the DOT regulations on packaging (49 CFR 171, 173, 178, and 179) or RRWAC Sections 4.4, 4.5, and 4.6. Wooden boxes 1.2 × 1.2 × 2.4 m (4 × 4 × 8 ft) and 0.6 × 1.2 × 2.4 m (2 × 4 × 8 ft) may be used for sizable waste (e.g., piping, concrete), as well as soils. Waste Generator Servicies (WGS) will be consulted to ensure the packaging is acceptable to the receiving facility.

Waste containers will be labeled with standard hazardous waste labels. The following information will be included on the labels:

- Unique bar code serial number
- Name of generating facility (i.e., OU 7-06)
- Phone number of generator contact
- Listed or characteristic waste code(s)
- Waste package gross weight
- Maximum radiation level on contact and at 1 m (3 ft) in air
- Waste stream or material identification number as assigned by the receiving facility
- Prior to shipping, other labels and markings as required by 49 CFR 172, Subparts D and B.

Any of the above information that is not known when the waste is labeled may be added when the information is known.

The unique bar code serial number is used for tracking and consists of a five-digit number followed by a single alpha designator. The alpha designator indicates which facility generated the bar code. Presently, only WROC generates the bar codes and their alpha designator is "K." These bar codes will be furnished by WROC in lots of 50. A new bar code will be affixed to each container when waste is first placed in the container.

Any waste shipped off the INEEL from WAG *5* must be labeled in accordance with applicable DOT labels and markings (49 CFR 172). Additionally, waste labels must be visible, legibly printed or stenciled, and placed so that a full set of labels and markings are visible. See RRWAC (DOE-ID 2002c) Section 4.4, 4.5, or 4.6 for additional labeling information.

6.2.4 Storage and Inspection

Wastes will be stored in the CERCLA waste storage unit (CWSU), PBF-ARA-1-CARGO-A, already established at ARA-I. Wastes stored in the CWSU will be stored in compliance with the *CERCLA Waste Storage Area Plan for PBF-ARA-1-CARGO-A* (INEEL 1999). This plan will be modified as necessary to accommodate wastes proposed for storage in the CWSU. If required due to space limitations, a new CERCLA storage area (CSA) may need to be established as the remedial action progresses. Determination of the CSA location will be coordinated with and approved by the appropriate ARA or PBF personnel. Wastes placed in wooden storage boxes ($1.2 \times 1.2 \times 2.4$ m [$4 \times 4 \times 8$ ft] and $0.6 \times 1.2 \times 2.4$ m [$2 \times 4 \times 8$ ft]), or other suitable containers, will be stored outside in a roped-off area and also maintained as a CSA. Waste segregated as low-level radioactive only (e.g., soils, PPE, wipes, etc.) will be stored in a radioactive materials area near the CSA. The radioactive materials area will be established at the same time as the CSA.

To meet the substantive requirements of 40 CFR 264, Subpart I, the RCRA ARARs inspection of the CWSU and CSA will be conducted as part of the weekly waste container inspection. The purposes of the weekly container inspection are to look for containers that are leaking, to look for containers that are deteriorating due to corrosion or other factors, to ensure that the containment system has not deteriorated due to corrosion, and to verify labels are in place and legible. Inspections of the containers and the CSA are conducted to meet the guidance contained in MCP-3475, "Temporary Storage of CERCLA-Generated Waste at the INEEL." The inspections will be documented on a weekly inspection form when completed. The checklists used to guide the inspection will be maintained in the CSA.

6.2.5 Personal Protective Equipment

The PPE requiring disposal may include, but is not limited to gloves, respirator cartridges, shoe covers, and coveralls. The PPE will be disposed in accordance with the requirements set forth in the RRWAC (DOE-ID 2002c).

6.2.6 Hazardous Waste Determinations

All wastes generated will be characterized as required by 40 CFR 262.11. Hazardous waste determinations will be prepared for all waste streams as per the requirements set forth in MCP-62, "Waste Generator Services—Low level Waste Management." Completed hazardous waste determinations will be maintained for all waste streams as part of the project file held by WGS. Additionally, the excavated soils will require characterization to verify that they meet the WAC of the disposal facility. The hazardous

waste determinations may use two approaches to determine whether a waste is characteristic and meets the disposal facility WAC:

1. Process knowledge may be used if there is sufficient existing information to characterize the waste. Process knowledge may include direct knowledge of the source of the contamination and/or existing validated analytical data.

2. Analysis of representative samples of the waste stream may be performed by either specialized RCRA protocols or standard protocols for sampling and laboratory analysis that are not specialized RCRA methods and other equivalent regulatory approved methods. Additionally, process knowledge and previous sampling activities may influence the amount of sampling and analysis required in order to perform characterization. It is anticipated that additional sampling will not be required by ICDF WAC.

Land disposal restrictions for hazardous wastes are addressed in 40 CFR 268. The INEEL specific requirements for treatment, storage, and disposal are addressed in the RRWAC (DOE-ID 2002c). After the hazardous waste determinations are completed, the INEEL Interim Waste Tracking System profile number is assigned and the appropriate information entered into the tracking system.

6.2.7 Waste Disposition

At the conclusion of the investigations, or when deemed necessary, industrial waste will be dispositioned to the INEEL landfill, following the protocols and completing the forms identified by the RRWAC (DOE-ID 2002c). When sufficient quantities of waste have been accumulated to ship to one of the INEEL waste management units, or off the INEEL to a commercial waste management facility, WGS will be contacted and the appropriate forms will be completed and submitted for approval, as required. The waste generator interface will provide assistance in packaging and transportation of the waste.

All low-level radioactive and mixed wastes will be handled and disposed in accordance with the requirements set forth in the RRWAC (DOE-ID 2002c). Following completion of sampling, the individual waste streams destined for disposal at the Radioactive Waste Management Complex (RWMC) or WROC will be approved and prepared for disposal in accordance with the requirements of the RRWAC (DOE-ID 2002c).

Management of contaminated wastes, generated at a subcontract laboratory during conductance of analytical testing, will be the responsibility of the subcontract laboratory. However, overall management of the samples must be in accordance with the requirements of MCP-3480, "Environmental Instructions for Facilities, Processes, Materials, and Equipment." Specifically, the MCP requires that the facility ES&H manager provide written approval prior to the return of any media and that written documentation of sample disposition be developed and maintained. To initiate the return of these wastes to the INEEL, the subcontract laboratory will notify Bechtel BWXT Idaho, LLC (BBWI) in the form of a written report identifying the known volume and characteristics of each waste type, including shipping and packaging details. Final authorization for the return of wastes will be provided in writing, from BBWI to the subcontract laboratory. In the event that laboratory wastes are returned, WGS will be contacted and they will determine the disposition of those wastes.

6.2.8 Recordkeeping and Reporting

Records and reports related to waste management are required to be maintained as indicated by MCP-3475, "Temporary Storage of CERCLA-Generated Waste at the INEEL." Some of these may be

completed by others, but must be available either at the ARA sites or with the WAG 5 project files. These records will include, but not be limited to, the following:

- Hazardous waste determinations, characterization information, and statements of process knowledge (by others)
- CWSU and CSA inspection reports and log-in, log-out history
- Training records
- Documentation with respect to all spills.

6.3 Project-Specific Waste Streams

Several distinct waste stream types anticipated to be generated during this project have been identified. Some of these waste types will be clean, but many could be contaminated with radionuclides. Subsequent to generation, any or all of the waste may be reclassified; therefore, the intended waste management strategies for each are outlined in Sections 6.3.1 through 6.3.6. These sections describe the expected sampling wastes that will require compliant storage and/or disposal, including the intended management strategy from the time of generation until final disposition. Field and laboratory personnel will be responsible for segregating wastes. The anticipated quantities have also been approximated; however, they are considered a rough order-of-magnitude because, in some cases, the type of contamination present cannot be determined prior to sampling and analysis. Estimated waste volumes are based on historical sampling activities conducted in support of other CERCLA actions conducted at the INEEL.

6.3.1 Personal Protective Equipment

The PPE in the form of coveralls, leather and rubber gloves, shoe covers or boots, and other anti-contamination clothing may be generated during the sampling activities. The anticipated quantities of PPE to be generated and requiring disposal as a result of the sampling activities for each of the sites are as follows:

- ARA-01: 0.76 m^3 (1 yd^3) classified as low-level radiological or conditional industrial
- ARA-12: 0.76 m^3 (1 yd^3) classified as low-level radiological or conditional industrial
- ARA-23: 3.8 m^3 (5 yd^3) classified as low-level radiological or conditional industrial.

6.3.2 Unused/Unaltered Sample Material

Unused/unaltered sample material will be generated from the sampling activities in the form of soils not required for sampling and analysis. Generally, the analytical laboratory will be responsible for disposal of the unused/unaltered sample material. In those cases where samples must be returned from the laboratory, this excess material will be managed in accordance with MCP-3002, "Managing Contaminated Soils." All unused/unaltered sample material received by the INEEL for disposal will be returned to the point of origin whenever possible. Conditions that may preclude the return of soil to the original sampling location include, but are not limited to:

- Soil layer may have been excavated

- Backfill material may have been placed over the sample location
- Analytical results show that the sample material contains contaminants in excess of the remedial action goals.

If conditions preclude the return of unused/unaltered sample material to the point of origin, then the sample material will require disposal at an approved facility such as the ICDF.

6.3.3 Analytical Residues

Analytical residues will be generated from the sample analytical activities conducted by subcontracted and/or on-Site laboratories. Although the laboratories are required to dispose of analytical residues under terms of the subcontract, the potential does exist for return of analytical residues. The anticipated quantity of analytical residues to be generated and requiring disposal as a result of the field sampling activities are 0.76 m^3 (1 yd^3), classified as low-level radioactive waste.

6.3.4 Sample Containers

Sample containers will become a waste stream following analyses. The sample containers will be wiped clean and surveyed by a Radiological Control Technician (RCT). In the event that the sample containers are classified as low-level radioactive waste, they will be disposed at the RWMC or approved off-Site facility; otherwise, the sample containers will be disposed of as conditional industrial waste at the CFA landfill. The anticipated quantities of sample containers to be generated and requiring disposal as a result of the field sampling activities are 0.76 m^3 (1 yd^3), classified based on RCT survey results.

6.3.5 Miscellaneous Wastes

Miscellaneous wastes such as trash, labels, rags, wipes, and other miscellaneous debris may be generated during the field sampling activities. Clean miscellaneous waste will be removed to the CFA landfill. In the event that miscellaneous waste is classified as low-level radioactive waste, it will be disposed at the RWMC Subsurface Disposal Area. The anticipated quantities of miscellaneous wastes to be generated and requiring disposal as a result of the field sampling activities are 1.53 m^3 (2 yd^3), classified based on RCT survey results.

6.3.6 Contaminated Sampling Equipment

Contaminated equipment will become a waste stream in the event that it cannot be decontaminated, or reused for another project and disposal is required. Contaminated sampling equipment will be expected to be decontaminated to meet RadCon release requirements, and may include hand augers, spoons, pans, and screens.

7. DOCUMENTATION MANAGEMENT AND SAMPLE CONTROL

Section 7.1 summarizes document management and sample control. Documentation includes field logbooks used to record field data and sampling procedures. Section 7.2 outlines the sample handling and discusses chain-of-custody and radioactivity screening for shipment to the analytical laboratory. The analytical results from this sampling effort will be documented in the semi-annual operating/shutdown cycle reports.

7.1 Documentation

The CC and/or FTL will be responsible for controlling and maintaining all field documents and records and for ensuring that all required documents will be submitted to the ER Administrative Records and Document Control. All entries will be made in permanent ink. All errors will be corrected by drawing a single line through the error and entering the correct information. All corrections will be initialed and dated.

7.1.1 Sample Container Labels

Waterproof, gummed labels generated from the SAP database will display information such as the sample ID number, the name of the project, sample location, and analysis type. In the field, labels will be completed and placed on the containers before collecting the sample. Information concerning sample date, time, preservative used, field measurements of hazards, and the sampler's initials will be filled out during field sampling.

7.1.2 Field Guidance Forms

Field guidance forms, provided for each sample location, will be generated from the SAP database, to ensure unique sample numbers. Used to facilitate sample container documentation and organization of field activities, these forms contain information regarding the following:

- Media
- Sample ID numbers
- Sample location
- Aliquot ID
- Analysis type
- Container size and type
- Sample preservation.

7.1.3 Field Logbooks

In accordance with Administrative Records and Document Control format, field logbooks will be used to record information necessary to interpret the analytical data. All field logbooks will be controlled and managed according to MCP-1194, "Logbook Practices for ER and Deactivation, Decontamination, and Decommissioning Projects."

7.1.3.1 Sample Logbooks. Sample logbooks will be used by the field teams. Each sample logbook will contain the following kinds of information:

- Physical measurements (if applicable)
- All QC samples
- Sample date, time, and location
- Shipping information (e.g., shipping dates, cooler ID number, destination, contaminant of concern number, name of shipper).

7.1.3.2 Field Team Leader's Daily Logbook. An operational logbook maintained by the FTL will contain a daily summary:

- All the project field activities
- Problems encountered
- Visitor log
- List of site contacts.

This logbook will be signed and dated at the end of each day's sampling activities.

7.1.3.3 Field Instrument Calibration/Standardization Logbook. A logbook containing records of calibration data will be maintained for each piece of equipment requiring periodic calibration or standardization. This logbook will contain logsheets to record the date, time, method of calibration, and instrument ID number.

7.2 Sample Handling

Analytical samples for laboratory analyses will be collected in precleaned containers and packaged according to American Society for Testing and Materials or EPA-recommended procedures. The QA samples will be included to satisfy the QA requirements for the field operation as outlined in the QAPjP (DOE-ID 2002a). Only qualified (SAM-approved) analytical and testing laboratories will analyze these samples.

7.2.1 Sample Preservation

Preservation of water samples will be performed immediately upon sample collection. If required for preservation, acid may be added to the bottles prior to sampling. For samples requiring controlled temperatures of 4°C (39°F) for preservation, the temperature will be checked periodically prior to shipment to certify adequate preservation. Ice chests (coolers) containing frozen reusable ice will be used to chill the samples, if required, in the field after sample collection.

7.2.2 Chain-of-Custody Procedures

The chain-of-custody procedures will be followed per the QAPjP (DOE-ID 2002a). Sample bottles will be stored in a secured area accessible only to the field team members.

7.2.3 Transportation of Samples

Samples will be shipped in accordance with the regulations issued by the DOT (49 CFR Parts 171 through 178) and EPA sample handling, packaging, and shipping methods (40 CFR 262 Subpart C and 40 CFR 263). All samples will be packaged in accordance with the requirements set forth in MCP-3480, "Environmental Instructions for Facilities, Processes, Materials, and Equipment."

7.2.3.1 Custody Seals. Custody seals will be placed on all shipping containers in such a way as to ensure that sample integrity is not compromised by tampering or unauthorized opening. Clear plastic tape will be placed over the seals to ensure that the seals are not damaged during shipment.

7.2.3.2 On-Site and Off-Site Shipping. An on-Site shipment is any transfer of material within the perimeter of the INEEL. Site-specific requirements for transporting of samples within Site boundaries and those required by the shipping/receiving department will be followed. Shipment within the INEEL boundaries will conform to DOT requirements, as stated in 49 CFR. All shipments will be coordinated with WGS, as necessary, and conform to the applicable packaging and transportation MCPs. RadCon personnel will screen all samples to be removed from the RWMC for radiological contaminants prior to shipment.

7.3 Document Revision Requests

Revisions to this document will follow the requirements set forth in MCP-233, "Process for Developing, Releasing, and Distributing ER Documents."

8. REFERENCES

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Appendix A

Sampling and Analysis Plan Tables

Plan Table Number: OU5-12 PHASE II
SAP Number:
Date: 08/04/00 Plan Table Revision: 0.0

SAMPLING AND ANALYSIS PLAN TABLE FOR CHEMICAL AND RADIOLOGICAL ANALYSIS

Project: PHASE 2 WAG 5 REMEDIAL ACTION ARA-01, ARA-12, AND ARA-23 Project Manager: FRANK L. WEBBER SMO Contact: DONNA R. KIRCHNER

SAMPLE DESCRIPTION						SAMPLE LOCATION				ENTER ANALYSIS TYPES (AT) AND QUANTITY REQUESTED																				
SAMPLING ACTIVITY	SAMPLE TYPE	MEDIA	COLL TYPE	SAMPLING METHOD	PLANNED DATE	AREA	LOCATION	TYPE OF LOCATION	DEPTH (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										#4	XH																		
RA5100	REG	SOIL	COMP		05/01/03	ARA-01	LOCATION #1	CONFIRMATION	0-0.5		1																		
RA5101	REG	SOIL	COMP		05/01/03	ARA-01	LOCATION #2	CONFIRMATION	0-0.5		1																		
RA5102	REG	SOIL	COMP		05/01/03	ARA-01	LOCATION #3	CONFIRMATION	0-0.5		1																		
RA5103	REG	SOIL	COMP		05/01/03	ARA-01	LOCATION #4	CONFIRMATION	0-0.5		1																		
RA5104	REG	SOIL	COMP		05/01/03	ARA-01	LOCATION #5	CONFIRMATION	0-0.5		1																		
RA5105	REG	SOIL	COMP		05/01/03	ARA-01	LOCATION #6	CONFIRMATION	0-0.5		1																		
RA5106	REG	SOIL	COMP		05/01/03	ARA-01	LOCATION #7	CONFIRMATION	0-0.5		1																		
RA5107	REG	SOIL	COMP		05/01/03	ARA-01	LOCATION #8	CONFIRMATION	0-0.5		1																		
RA5108	REG	SOIL	COMP		05/01/03	ARA-01	LOCATION #9	CONFIRMATION	0-0.5		1																		
RA5109	REG/QC	SOIL	COMP		05/01/03	ARA-01	LOCATION #10	CONFIRMATION	0-0.5		2																		
RA5110	REG	SOIL	COMP		05/01/03	ARA-12	LOCATION #1	CONFIRMATION	0-0.5	1	1																		
RA5111	REG	SOIL	COMP		05/01/03	ARA-12	LOCATION #2	CONFIRMATION	0-0.5	1	1																		
RA5112	REG	SOIL	COMP		05/01/03	ARA-12	LOCATION #3	CONFIRMATION	0-0.5	1	1																		
RA5113	REG	SOIL	COMP		05/01/03	ARA-12	LOCATION #4	CONFIRMATION	0-0.5	1	1																		
RA5114	REG	SOIL	COMP		05/01/03	ARA-12	LOCATION #5	CONFIRMATION	0-0.5	1	1																		

The sampling activity displayed on this table represents the first six characters of the sample identification number. The complete sample identification number (10 characters) will appear on field guidance forms and sample labels.

AT1: Gamma Spectroscopy
AT2: Total Metals
AT3:
AT4:
AT5:
AT6:
AT7:
AT8:
AT9:
AT10:
AT11:
AT12:
AT13:
AT14:
AT15:
AT16:
AT17:
AT18:
AT19:
AT20:

COMMENTS

ARA-01 Total Metals = arsenic, selenium, and thallium

ARA-12 Total Metals = copper, mercury, and selenium

Plan Table Number: OU5-12 PHASE II
SAP Number:
Date: 08/04/00 Plan Table Revision: 0.0

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SAMPLE DESCRIPTION						SAMPLE LOCATION				ENTER ANALYSIS TYPES (AT) AND QUANTITY REQUESTED																			
SAMPLING ACTIVITY	SAMPLE TYPE	MEDIA	COLL TYPE	SAMPLING METHOD	PLANNED DATE	AREA	LOCATION	TYPE OF LOCATION	DEPTH (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										R4	XH																		
RA5115	REG	SOIL	COMP		05/01/03	ARA-12	LOCATION #6	CONFIRMATION	0-0.5	1	1																		
RA5116	REG	SOIL	COMP		05/01/03	ARA-12	LOCATION #7	CONFIRMATION	0-0.5	1	1																		
RA5117	REG	SOIL	COMP		05/01/03	ARA-12	LOCATION #8	CONFIRMATION	0-0.5	1	1																		
RA5118	REG	SOIL	COMP		05/01/03	ARA-12	LOCATION #9	CONFIRMATION	0-0.5	1	1																		
RA5119	REG/QC	SOIL	COMP		05/01/03	ARA-12	LOCATION #10	CONFIRMATION	0-0.5	2	2																		
RA5120	REG	SOIL	COMP		05/01/03	ARA-23	ARA-1 #1	CONFIRMATION	0-0.5	1																			
RA5121	REG	SOIL	COMP		05/01/03	ARA-23	ARA-1 #2	CONFIRMATION	0-0.5	1																			
RA5122	REG	SOIL	COMP		05/01/03	ARA-23	ARA-1 #3	CONFIRMATION	0-0.5	1																			
RA5123	REG	SOIL	COMP		05/01/03	ARA-23	ARA-1 #4	CONFIRMATION	0-0.5	1																			
RA5124	REG	SOIL	COMP		05/01/03	ARA-23	ARA-1 #5	CONFIRMATION	0-0.5	1																			
RA5125	REG	SOIL	COMP		05/01/03	ARA-23	ARA-1 #6	CONFIRMATION	0-0.5	1																			
RA5126	REG	SOIL	COMP		05/01/03	ARA-23	ARA-1 #7	CONFIRMATION	0-0.5	1																			
RA5127	REG	SOIL	COMP		05/01/03	ARA-23	ARA-1 #8	CONFIRMATION	0-0.5	1																			
RA5128	REG	SOIL	COMP		05/01/03	ARA-23	ARA-1 #9	CONFIRMATION	0-0.5	1																			
RA5129	REG/QC	SOIL	COMP		05/01/03	ARA-23	ARA-1 #10	CONFIRMATION	0-0.5	2																			

The sampling activity displayed on this table represents the first six characters of the sample identification number.
The complete sample identification number (10 characters) will appear on field guidance forms and sample labels.

AT1: Gamma Spectroscopy
AT2: Total Metals
AT3:
AT4:
AT5:
AT6:
AT7:
AT8:
AT9:
AT10:

AT11:
AT12:
AT13:
AT14:
AT15:
AT16:
AT17:
AT18:
AT19:
AT20:

COMMENTS

ARA-01 Total Metals = arsenic, selenium, and thallium
ARA-12 Total Metals = copper, mercury, and selenium

Plan Table Number: OU5-12 PHASE II
SAP Number:
Date: 08/04/00 Plan Table Revision: 0.0

SAMPLING AND ANALYSIS PLAN TABLE FOR CHEMICAL AND RADIOLOGICAL ANALYSIS

Project: PHASE 2 WAG 5 REMEDIAL ACTION ARA-01, ARA-12, AND ARA-23 Project Manager: FRANK L. WEBBER SMO Contact: DONNA R. KIRCHNER

SAMPLE DESCRIPTION						SAMPLE LOCATION				ENTER ANALYSIS TYPES (AT) AND QUANTITY REQUESTED																				
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										R4	XM																		
RA5130	REG	SOIL	COMP		05/01/03	ARA-23	ARA-II #1	CONFIRMATION	0-0.5	1																			
RA5131	REG	SOIL	COMP		05/01/03	ARA-23	ARA-II #2	CONFIRMATION	0-0.5	1																			
RA5132	REG	SOIL	COMP		05/01/03	ARA-23	ARA-II #3	CONFIRMATION	0-0.5	1																			
RA5133	REG	SOIL	COMP		05/01/03	ARA-23	ARA-II #4	CONFIRMATION	0-0.5	1																			
RA5134	REG	SOIL	COMP		05/01/03	ARA-23	ARA-II #5	CONFIRMATION	0-0.5	1																			
RA5135	REG	SOIL	COMP		05/01/03	ARA-23	ARA-II #6	CONFIRMATION	0-0.5	1																			
RA5136	REG	SOIL	COMP		05/01/03	ARA-23	ARA-II #7	CONFIRMATION	0-0.5	1																			
RA5137	REG	SOIL	COMP		05/01/03	ARA-23	ARA-II #8	CONFIRMATION	0-0.5	1																			
RA5138	REG	SOIL	COMP		05/01/03	ARA-23	ARA-II #9	CONFIRMATION	0-0.5	1																			
RA5139	REG/QC	SOIL	COMP		05/01/03	ARA-23	ARA-II #10	CONFIRMATION	0-0.5	2																			
RA5140	REG	SOIL	COMP		05/01/03	ARA-23	HAUL ROAD #1	CONFIRMATION	0-0.5	1																			
RA5141	REG	SOIL	COMP		05/01/03	ARA-23	HAUL ROAD #2	CONFIRMATION	0-0.5	1																			
RA5142	REG	SOIL	COMP		05/01/03	ARA-23	HAUL ROAD #3	CONFIRMATION	0-0.5	1																			
RA5143	REG	SOIL	COMP		05/01/03	ARA-23	HAUL ROAD #4	CONFIRMATION	0-0.5	1																			
RA5144	REG	SOIL	COMP		05/01/03	ARA-23	HAUL ROAD #5	CONFIRMATION	0-0.5	1																			

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AT1: Gamma Spectroscopy
AT2: Total Metals
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COMMENTS

ARA-01 Total Metals = arsenic, selenium, and thallium
ARA-12 Total Metals = copper, mercury, and selenium

Plan Table Number: OU5-12 PHASE II
SAP Number:
Date: 08/04/00 Plan Table Revision: 0.0

SAMPLING AND ANALYSIS PLAN TABLE FOR CHEMICAL AND RADIOLOGICAL ANALYSIS

Project: PHASE 2 WAG 5 REMEDIAL ACTION ARA-01, ARA-12, AND ARA-23 Project Manager: FRANK L. WEBBER SMO Contact: DONNA M. KIRCHNER

SAMPLE DESCRIPTION						SAMPLE LOCATION				ENTER ANALYSIS TYPES (AT) AND QUANTITY REQUESTED																				
SAMPLING ACTIVITY	SAMPLE TYPE	MEDIA	COLL TYPE	SAMPLING METHOD	PLANNED DATE	AREA	LOCATION	TYPE OF LOCATION	DEPTH (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										R4	XH																		
RA5145	REG	SOIL	COMP		05/01/03	ARA-23	HAUL ROAD #6	CONFIRMATION	0-0.5	1																			
RA5146	REG	SOIL	COMP		05/01/03	ARA-23	HAUL ROAD #7	CONFIRMATION	0-0.5	1																			
RA5147	REG	SOIL	COMP		05/01/03	ARA-23	HAUL ROAD #8	CONFIRMATION	0-0.5	1																			
RA5148	REG	SOIL	COMP		05/01/03	ARA-23	HAUL ROAD #9	CONFIRMATION	0-0.5	1																			
RA5149	REG/QC	SOIL	COMP		05/01/03	ARA-23	HAUL ROAD #10	CONFIRMATION	0-0.5	2																			
RA5150	REG	SOIL	COMP		05/01/03	ARA-23	WASH DOWN #1	CONFIRMATION	0-0.5	1																			
RA5151	REG	SOIL	COMP		05/01/03	ARA-23	WASH DOWN #2	CONFIRMATION	0-0.5	1																			
RA5152	REG	SOIL	COMP		05/01/03	ARA-23	WASH DOWN #3	CONFIRMATION	0-0.5	1																			
RA5153	REG	SOIL	COMP		05/01/03	ARA-23	WASH DOWN #4	CONFIRMATION	0-0.5	1																			
RA5154	REG	SOIL	COMP		05/01/03	ARA-23	WASH DOWN #5	CONFIRMATION	0-0.5	1																			
RA5155	REG	SOIL	COMP		05/01/03	ARA-23	WASH DOWN #6	CONFIRMATION	0-0.5	1																			
RA5156	REG	SOIL	COMP		05/01/03	ARA-23	WASH DOWN #7	CONFIRMATION	0-0.5	1																			
RA5157	REG	SOIL	COMP		05/01/03	ARA-23	WASH DOWN #8	CONFIRMATION	0-0.5	1																			
RA5158	REG	SOIL	COMP		05/01/03	ARA-23	WASH DOWN #9	CONFIRMATION	0-0.5	1																			
RA5159	REG/QC	SOIL	COMP		05/01/03	ARA-23	WASH DOWN #10	CONFIRMATION	0-0.5	2																			

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COMMENTS

ARA-01 Total Metals = arsenic, selenium, and thallium
ARA-12 Total Metals = copper, mercury, and selenium

Plan Table Number: OU5-12 PHASE II
SAP Number:
Date: 08/04/00 Plan Table Revision: 0.0

SAMPLING AND ANALYSIS PLAN TABLE FOR CHEMICAL AND RADIOLOGICAL ANALYSIS

Project: PHASE 2 WAG 5 REMEDIAL ACTION ARA-01, ARA-12, AND ARA-23 Project Manager: FRANK L. WEBBER SMO Contact: DONNA R. KIRCHNER

SAMPLE DESCRIPTION						SAMPLE LOCATION				ENTER ANALYSIS TYPES (AT) AND QUANTITY REQUESTED																					
SAMPLING ACTIVITY	SAMPLE TYPE	MEDIA	COLL TYPE	SAMPLING METHOD	PLANNED DATE	AREA	LOCATION	TYPE OF LOCATION	DEPTH (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										R4	XM																		
RA5160	REG	SOIL	COMP		05/01/03	ARA-23	WINDBLOWN #1	CONFIRMATION	0-0.5	1																			
RA5161	REG	SOIL	COMP		05/01/03	ARA-23	WINDBLOWN #2	CONFIRMATION	0-0.5	1																			
RA5162	REG	SOIL	COMP		05/01/03	ARA-23	WINDBLOWN #3	CONFIRMATION	0-0.5	1																			
RA5163	REG	SOIL	COMP		05/01/03	ARA-23	WINDBLOWN #4	CONFIRMATION	0-0.5	1																			
RA5164	REG	SOIL	COMP		05/01/03	ARA-23	WINDBLOWN #5	CONFIRMATION	0-0.5	1																			
RA5165	REG	SOIL	COMP		05/01/03	ARA-23	WINDBLOWN #6	CONFIRMATION	0-0.5	1																			
RA5166	REG	SOIL	COMP		05/01/03	ARA-23	WINDBLOWN #7	CONFIRMATION	0-0.5	1																			
RA5167	REG	SOIL	COMP		05/01/03	ARA-23	WINDBLOWN #8	CONFIRMATION	0-0.5	1																			
RA5168	REG	SOIL	COMP		05/01/03	ARA-23	WINDBLOWN #9	CONFIRMATION	0-0.5	1																			
RA5169	REG/QC	SOIL	COMP		05/01/03	ARA-23	WINDBLOWN #10	CONFIRMATION	0-0.5	2																			
RA5170	QC	WATER	RNST		05/01/03	ARA-01	QC	RINSATE	N/A		1																		
RA5171	QC	WATER	RNST		05/01/03	ARA-12	QC	RINSATE	N/A	1	1																		
RA5172	QC	WATER	RNST		05/01/03	ARA-23	QC ARA-I	RINSATE	N/A	1																			
RA5173	QC	WATER	RNST		05/01/03	ARA-23	QC ARA-II	RINSATE	N/A	1																			
RA5174	QC	WATER	RNST		05/01/03	ARA-23	QC HAUL ROAD	RINSATE	N/A	1																			

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COMMENTS

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ARA-12 Total Metals = copper, mercury, and selenium

Plan Table Number: OU5-12 PHASE II
SAP Number:
Date: 08/04/00 Plan Table Revision: 0.0

SAMPLING AND ANALYSIS PLAN TABLE FOR CHEMICAL AND RADIOLOGICAL ANALYSIS

Project: PHASE 2 WAG 5 REMEDIAL ACTION ARA-01, ARA-12, AND ARA-23 Project Manager: FRANK L. WEBBER SMO Contact: DONNA R. KIRCHNER

SAMPLE DESCRIPTION						SAMPLE LOCATION				ENTER ANALYSIS TYPES (AT) AND QUANTITY REQUESTED																			
SAMPLING ACTIVITY	SAMPLE TYPE	MEDIA	COLL TYPE	SAMPLING METHOD	PLANNED DATE	AREA	LOCATION	TYPE OF LOCATION	DEPTH (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										R4	XM																		
RA5175	QC	WATER	RNST		05/01/03	ARA-23	QC WASH DOWN	RINSATE	N/A	1																			
RA5176	QC	WATER	RNST		05/01/03	ARA-23	QC WINDBLOWN	RINSATE	N/A	1																			

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COMMENTS

ARA-01 Total Metals = arsenic, selenium, and thallium
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